U.S. DEPARTMENT OF COMMERCE
National Technical Information Service

PB-266 789

Millwood Reservoir, Hempstead Howard, Little River, and Sevier Counties, Arkansas

National Eutrophication Survey, Las Vegas, Nev

Prepared for

Environmental Monitoring and Support Lab, Las Vegas, Nev

Jan 77

PB 266 789

REPORT
ON
MILLWOOD RESERVOIR
HEMPSTEAD, HOWARD, LITTLE RIVER,
AND SEVIER COUNTIES
ARKANSAS

EPA REGION VI

WORKING PAPER No. 489

REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U. S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA. 22161

WITH THE COOPERATION OF THE

ARKANSAS DEPARTMENT OF POLLUTION

CONTROL AND ECOLOGY

AND THE

ARKANSAS NATIONAL GUARD

JANUARY, 1977

CONTENTS

	Page
Foreword	ii
List of Arkansas Study Lakes	iv
Lake and Drainage Area Map	v
Sections	
I. Conclusions	1
II. Lake and Drainage Basin Characteristics	4
III. Lake Water Quality Summary	6
IV. Nutrient Loadings	11
V. Literature Reviewed	17
VI. Appendices	18

FOREWORD

The National Eutrophication Survey was initiated in 1972 in response to an Administration commitment to investigate the nationwide threat of accelerated eutrophication to freshwater lakes and reservoirs.

OBJECTIVES

The Survey was designed to develop, in conjunction with state environmental agencies, information on nutrient sources, concentrations, and impact on selected freshwater lakes as a basis for formulating comprehensive and coordinated national, regional, and state management practices relating to point source discharge reduction and nonpoint source pollution abatement in lake watersheds.

ANALYTIC APPROACH

The mathematical and statistical procedures selected for the Survey's eutrophication analysis are based on related concepts that:

a. A generalized representation or model relating sources, concentrations, and impacts can be constructed.

b. By applying measurements of relevant parameters associated with lake degradation, the generalized model can be transformed into an operational representation of a lake, its drainage basin, and related nutrients.

c. With such a transformation, an assessment of the potential for eutrophication control can be made.

LAKE ANALYSIS

In this report, the first stage of evaluation of lake and watershed data collected from the study lake and its drainage basin is documented. The report is formatted to provide state environmental agencies with specific information for basin planning [§303(e)], water quality criteria/standards review [§303(c)], clean lakes [§314(a,b)], and water quality monitoring [§106 and §305(b)] activities mandated by the Federal Water Pollution Control Act Amendments of 1972.

Beyond the single lake analysis, broader based correlations between nutrient concentrations (and loading) and trophic condition are being made to advance the rationale and data base for refinement of nutrient water quality criteria for the Nation's freshwater lakes. Likewise, multivariate evaluations for the relationships between land use, nutrient export, and trophic condition, by lake class or use, are being developed to assist in the formulation of planning guidelines and policies by the U.S. Environmental Protection Agency and to augment plans implementation by the states.

ACKNOWLEDGMENTS

The staff of the National Eutrophication Survey (Office of Research and Development, U.S. Environmental Protection Agency) expresses sincere appreciation to the Arkansas Department of Pollution Control and Ecology for professional involvement, to the Arkansas National Guard for conducting the tributary sampling phase of the Survey, and to those Arkansas wastewater treatment plant operators who provided effluent samples and flow data.

The staff of the Water Division of the Arkansas Department of Pollution Control and Ecology provided invaluable lake documentation and counsel during the Survey, reviewed the preliminary reports and provided critiques most useful in the preparation of this Working Paper series.

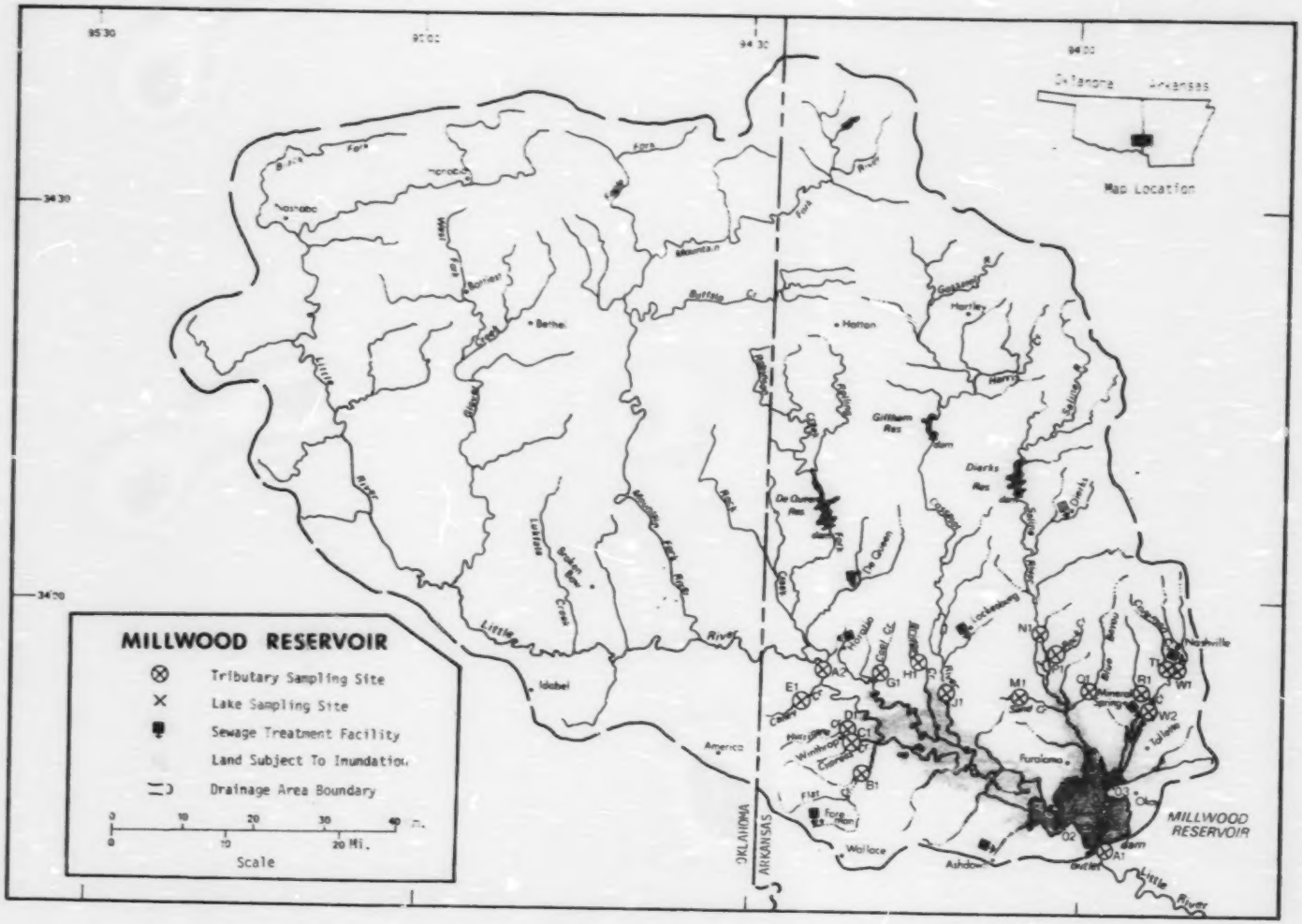
Major General Thomas C. Armstrong, the Adjutant General of Arkansas, and Project Officer Colonel Lavaun M. James, who directed the volunteer efforts of the Arkansas National Guardsmen, are also gratefully acknowledged for their assistance to the Survey.

NATIONAL EUTROPHICATION SURVEY

STUDY LAKES

STATE OF ARKANSAS

LAKE NAME	COUNTY
Beaver	Benton, Carroll, Washington
Blackfish	Crittenden, St. Francis
Blue Mountain	Logan, Yell
Bull Shoals	Baxter, Boone, Marion (Taney, Ozark in MO)
Catherine	Garland, Hot Spring
Chicot	Chicot
DeGray	Clark, Hot Spring
Erling	Lafayette
Grand	Chicot
Greer's Ferry	Van Buren, Cleburne
Hamilton	Garland
Millwood	Hempstead, Howard, Little River, Sevier
Nimrod	Perry, Yell
Norfork	Baxter, Fulton (Ozark in MO)
Ouachita	Garland, Montgomery
Table Rock	Boone, Carroll (Barry, Taney in MO)


MILLWOOD RESERVOIR
Tributary Sampling Site
Lake Sampling Site
Sewage Treatment Facility
Land Subject To Inundation
Drainage Area Boundary
0 10 20 30 40 mi.
0 10 20 Mi.
Scale
Oklahoma
Arkansas
Map Location
OKLAHOMA
ARKANSAS
MILLWOOD RESERVOIR
dam
Little River
Idabel
America
Wallace
Ashdown
Foreman
Furlonia
Texarkana
Hatton
Gillham Res
Dierks Res
De Queen Res
De Queen
Lockesburg
Horatio
Nashville
Howard
Sevier
Little River
Little River
Little River

REPORT ON MILLWOOD RESERVOIR, ARKANSAS

STORET NO. 0511

I. CONCLUSIONS

A. Trophic Condition:*

Millwood Reservoir is considered eutrophic, i.e., nutrient rich and highly productive, on the basis of Survey data and field observations. Whether such nutrient enrichment is to be considered beneficial or deleterious is determined by its actual or potential impact upon designated beneficial water uses of the lake.

Chlorophyll a levels ranged from 3.0 µg/l in the spring to 50.6 µg/l in the summer with a mean of 15.0 µg/l. Mean Secchi disc visibility was 33 cm (13 inches). Of the 16 Arkansas lakes sampled in 1974, 5 had greater median total phosphorus levels, 13 had greater median inorganic nitrogen values, and 5 had greater median orthophosphorus levels than Millwood Reservoir.

Survey limnologists reported an algal bloom during autumn sampling and many submerged and emergent aquatic macrophytes along the shoreline areas.

*See Appendix E

B. Rate-Limiting Nutrient:

Algal assay results indicate that Millwood Reservoir was limited by available phosphorus during spring sampling. Mean inorganic nitrogen to orthophosphorus ratios (N/P) in the lake data suggest primary limitation by nitrogen in the spring and fall (5/1 and 12/1, respectively) and phosphorus limitation in the summer (25/1).

C. Nutrient Controllability:

1. Point sources -

Point sources were estimated to contribute 6.8% of the total phosphorus load to Millwood Reservoir during the 1974 sampling year. The city of DeQueen contributed 2.6%, the city of Nashville contributed 1.5%, and the city of Ashdown was estimated to have contributed 1.1%.

The calculated phosphorus loading of 2.22 g $P/m^2/yr$ is nearly two times the proposed Vollenweider (1975) eutrophic loading. However, loading calculations yield a net export of phosphorus from Millwood Reservoir, indicating sampling was not adequate to depict actual loading and/or nutrient export values for the lake. This apparent export could be due to an underestimation of phosphorus loading from the ungaged tributaries to the reservoir, to unknown industrial or municipal point sources, or to sampling error.

2. Nonpoint sources -

It is estimated that 93.2% of the total phosphorus input to Millwood Reservoir was contributed by nonpoint sources during the sampling year. Ungaged tributaries were estimated to have contributed 13.8%, the Little River contributed 61.8%, and Saline River contributed 7.6%. The remaining five gaged tributaries collectively contributed a total of 9.3%.

II. LAKE AND DRAINAGE BASIN CHARACTERISTICS

Lake and drainage basin characteristics are itemized below. Lake morphometry values were provided by the Arkansas Department of Pollution Control and Ecology. Tributary flow data were provided by the Arkansas District Office of the U.S. Geological Survey (USGS). Outlet drainage area includes the lake surface area. Mean hydraulic retention time was obtained by dividing the lake volume by mean flow of the outlet. Precipitation values are estimated by methods as outlined in National Eutrophication Survey (NES) Working Paper No. 175. A table of metric/English conversions is included as Appendix A.

A. Lake Morphometry:

1. Surface area: 118.17 km^2.
2. Mean depth: 2.2 meters.
3. Maximum depth: 11.0 meters.
4. Volume: 254.099 x 10^6 m^3.
5. Mean hydraulic retention time: 18 days.

B. Tributary and Outlet:
(See Appendix B for flow data)

1. Tributaries -

Name	Drainage area (km^2)	Mean flow (m^3/sec)
A-2 Little River	6,925.7	107.86
B-1 Flat Creek	159.5	2.33
J-1 Cossatot River	1,129.2	16.85
N-1 Saline River	673.4	9.88
Q-1 Blue Bayou	60.6	0.91
R-1 Dillard Creek	44.5	0.67
T-1 Coleman Creek	43.5	0.70
Minor tributaries and immediate drainage -	1,578.2	26.09
Totals	10,614.6	165.29
2. Outlet - A-1 Little River	10,733.0	162.98

C. Precipitation:

1. Year of sampling: 166.5 cm.
2. Mean annual: 77.1 cm.

III. LAKE WATER QUALITY SUMMARY

Millwood Reservoir was sampled three times during the open-water season of 1974 by means of a pontoon-equipped Huey helicopter. Each time, samples for physical and chemical parameters were collected from three stations on the lake and from a number of depths at each station (see map, page i). During each visit, depth-integrated samples were collected from each station for chlorophyll a analysis and phytoplankton identification and enumeration. During the first and last visits, 18.9-liter depth-integrated samples were composited for algal assays. Maximum depths sampled were 9.1 meters at Station 01, 9.1 meters at Station 02, and 3.0 meters at Station 03. For a more detailed explanation of NES methods, see NES Working Paper No. 175.

The results obtained are presented in full in Appendix C and are summarized in III-A for waters at the surface and at the maximum depth for each site. Results of the phytoplankton counts and chlorophyll a determinations are included in III-B. Results of the limiting nutrient study are presented in III-C.

...OOD LAKE
...ET COVE HILL

A. PHYSICAL AND CHEMICAL CHARACTERISTICS

PARAMETER	(3/25/74) *** = 3			MAX DEPTH RANGE (METERS)		(6/ 3/74) *** = 3			MAX DEPTH RANGE (METERS)		(10/17/74) *** = 3			MAX DEPTH RANGE (METERS)	
	N*	RANGE	MEDIAN			N*	RANGE	MEDIAN			N*	RANGE	MEDIAN		
TEMPERATURE (DEG CENT)															
0.-1.5 M DEPTH	6	11.0- 11.7	11.2	0.0-	1.5	6	26.1- 26.6	26.3	0.0-	1.5	6	18.7- 19.4	18.9	0.0-	1.5
MAX DEPTH**	3	10.7- 11.7	11.1	3.0-	9.1	3	24.4- 25.8	25.8	3.0-	9.1	3	18.2- 18.8	18.7	2.4-	9.1
DISSOLVED OXYGEN (MG/L)															
0.-1.5 M DEPTH	3	8.4- 9.8	9.4	1.5-	1.5	3	6.0- 8.6	7.6	1.5-	1.5	6	7.4- 8.6	7.7	0.0-	1.5
MAX DEPTH**	3	8.6- 10.4	9.4	3.0-	9.1	3	5.4- 6.2	5.4	3.0-	9.1	3	7.4- 7.8	7.4	2.4-	9.1
CONDUCTIVITY (UMHOS)															
0.-1.5 M DEPTH	6	35.- 109.	35.	0.0-	1.5	6	67.- 158.	77.	0.0-	1.5	6	31.- 147.	45.	0.0-	1.5
MAX DEPTH**	3	34.- 107.	35.	3.0-	9.1	3	67.- 161.	75.	3.0-	9.1	3	31.- 153.	42.	2.4-	9.1
PH (STANDARD UNITS)															
0.-1.5 M DEPTH	6	6.6- 7.8	6.9	0.0-	1.5	6	6.7- 9.0	7.7	0.0-	1.5	6	6.1- 6.4	6.2	0.0-	1.5
MAX DEPTH**	3	6.5- 7.7	6.9	3.0-	9.1	3	6.6- 8.2	7.0	3.0-	9.1	3	6.1- 6.2	6.2	7.0-	9.1
TOTAL ALKALINITY (MG/L)															
0.-1.5 M DEPTH	6	19.- 52.	22.	0.0-	1.5	6	20.- 67.	21.	0.0-	1.5	6	13.- 74.	20.	0.0-	1.5
MAX DEPTH**	3	17.- 49.	20.	3.0-	9.1	3	19.- 66.	21.	3.0-	9.1	3	14.- 74.	21.	2.4-	9.1
TOTAL P (MG/L)															
0.-1.5 M DEPTH	6	0.033-0.036	0.035	0.0-	1.5	6	0.038-0.065	0.060	0.0-	1.5	6	0.032-0.064	0.043	0.0-	1.5
MAX DEPTH**	3	0.037-0.038	0.037	3.0-	9.1	3	0.059-0.071	0.063	3.0-	9.1	3	0.033-0.040	0.043	2.4-	9.1
DISSOLVED ORTHO P (MG/L)															
0.-1.5 M DEPTH	6	0.017-0.026	0.021	0.0-	1.5	6	0.002-0.008	0.004	0.0-	1.5	6	0.006-0.009	0.008	0.0-	1.5
MAX DEPTH**	3	0.017-0.025	0.024	3.0-	9.1	3	0.004-0.007	0.006	3.0-	9.1	3	0.006-0.008	0.007	2.4-	9.1
NO2+NO3 (MG/L)															
0.-1.5 M DEPTH	6	0.040-0.100	0.090	0.0-	1.5	6	0.020-0.160	0.040	0.0-	1.5	6	0.020-0.090	0.030	0.0-	1.5
MAX DEPTH**	3	0.040-0.100	0.090	3.0-	9.1	3	0.030-0.160	0.060	3.0-	9.1	3	0.020-0.090	0.040	2.4-	9.1
AMMONIA (MG/L)															
0.-1.5 M DEPTH	6	0.030-0.050	0.040	0.0-	1.5	6	0.020-0.060	0.030	0.0-	1.5	6	0.030-0.070	0.060	0.0-	1.5
MAX DEPTH**	3	0.030-0.040	0.040	3.0-	9.1	3	0.030-0.090	0.060	3.0-	9.1	3	0.030-0.060	0.040	2.4-	9.1
KJELDAHL N (MG/L)															
0.-1.5 M DEPTH	6	0.300-0.400	0.350	0.0-	1.5	6	0.500-1.000	0.600	0.0-	1.5	6	0.400-0.700	0.550	0.0-	1.5
MAX DEPTH**	3	0.300-0.400	0.300	3.0-	9.1	3	0.500-0.700	0.500	3.0-	9.1	3	0.400-0.600	0.400	2.4-	9.1
SECCHI DISC (METERS)															
	3	0.6- 0.9	0.7			3	0.8- 1.5	0.9			3	0.6- 0.9	0.7		

* N = NO. OF SAMPLES
** MAXIMUM DEPTH SAMPLED AT EACH SITE
*** S = NO. OF SITES SAMPLED ON THIS DATE

B. Biological Characteristics:

1. Phytoplankton -

Sampling Date	Dominant Genera	Algal Units per ml
03/25/74	1. Chroomonas	698
	2. Melosira	698
	3. Carteria	220
	4. Cryptomonas	220
	5. Flagellates	220
	Other genera	884
	Total	2,940
06/03/74	1. Melosira	2822
	2. Anabaena	541
	3. Dinobryon	502
	4. Flagellates	464
	5. Dactylococcopsis	425
	Other genera	2551
	Total	7,305
10/17/74	1. Centric diatoms	438
	2. Melosira	341
	3. Chroomonas	195
	4. Dactylococcopsis	97
	5. Cryptomonas	49
	Other genera	146
	Total	1,266

2. Chlorophyll *a* -

Sampling Date	Station Number	Chlorophyll *a* (µg/l)
03/25/74	01	3.8
	02	3.0
	03	6.2
06/03/74	01	29.6
	02	9.8
	03	50.6
10/17/74	01	7.9
	02	6.1
	03	17.7

C. Limiting Nutrient Study:

1. Autoclaved, filtered, and nutrient spiked - 03/25/74

Spike(mg/l)	Ortho P Conc.(mg/l)	Inorganic N Conc.(mg/l)	Maximum Yield (mg/l-dry wt.)
Control	0.010	0.093	0.1
0.05 P	0.060	0.093	2.4
0.05 P + 1.0 N	0.060	1.093	21.7
1.00 N	0.010	1.093	0.1

2. Discussion -

The control yield of the assay alga, Selenastrum capricornutum, indicates that the potential for primary production was low in Millwood Reservoir during spring sampling. The increase in yield with the addition of phosphorus as well as the lack of response to the addition of nitrogen indicates phosphorus limitation. Maximum yield was achieved with the simultaneous addition of both phosphorus and nitrogen.

The autumn algal assay results are not considered reliable because of a significant change in the nutrient levels between the time the sample was collected and the assay was begun.

Mean N/P ratios in the lake data were 5/1 and 12/1 in the spring and fall, respectively, suggesting primary limitation by nitrogen, and 25/1 in the summer, indicating phosphorus limitation in Millwood Reservoir.

IV. NUTRIENT LOADINGS
(See Appendix D for data)

For the determination of nutrient loadings, the Arkansas National Guard collected monthly near-surface grab samples from each of the tributary sites indicated on the map (page i), except for the high runoff months of March and April when two samples were collected. Sampling was begun in June 1974, and was completed in May 1975.

Through an interagency agreement, stream flow estimates for the year of sampling and a "normalized" or average year were provided by the Arkansas District Office of the USGS for the tributary sites nearest the lake.

In this report, nutrient loads for sampled tributaries were determined by using a modification of a USGS computer program for calculating stream loadings. Nutrient loads indicated for tributaries are those measured minus known point source loads, if any.

Nutrient loadings for unsampled "minor tributaries and immediate drainage" ("ZZ" of USGS) were estimated by using the mean annual nutrient loads, in $kg/km^2/yr$, in Blue Bayou, Dillard Creek, and Coleman Creek at Stations Q-1, R-1, and T-1, and multiplying the means by the ZZ area in km^2.

The operators of the Nashville, Foreman, DeQueen, and Dierks wastewater treatment plants provided monthly effluent samples and corresponding flow data. Nutrient loads for the Horatio, Lockesburg, Mineral Springs, and Ashdown wastewater treatment plants were estimated at 1.134 kg P and 3.401 kg N/Capita/yr.

A. Waste Sources:

1. Known municipal -

Name	Pop.* Served	Treatment*	Mean Flow ($m^3/d \times 10^3$)	Receiving Water*
Nashville†	4,400	Stabilization pond	3.005	Mine Creek
Foreman	1,150	Stabilization pond	0.531	East Flat Creek
DeQueen†	4,100	Stabilization pond	4.278	Bear Creek/ Little Creek
Dierks	1,500	Stabilization pond	0.380	Holly Creek/ Saline River
Horatio	775	Stabilization pond	0.293**	Little River/ Red River
Lockesburg	621	Stabilization pond	0.235**	Cossatot River
Mineral Springs***	560	Stabilization pond	0.212**	Mine Creek
Ashdown***	2,480	Stabilization	0.939**	Millwood Reservoir

2. Known industrial - †

*Treatment plant questionnaires.
**Estimated at 0.3785 m^3/capita/day.
***U.S. EPA, 1971.
†50% of the total load to the Nashville STP, and 75% to the DeQueen plant are contributed by poultry processing.

B. Annual Total Phosphorus Loading - Average Year:

1. Inputs -

Source	kg P/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Little River	162,010	61.7
B-1 Flat Creek	3,690	1.4
J-1 Cossatot River	17,515	6.7
N-1 Saline River	19,860	7.6
Q-1 Blue Baycu	1,175	0.4
R-1 Dillard Creek	1,305	0.5
T-1 Coleman Creek	860	0.3
b. Minor tributaries and immediate drainage (nonpoint load) -	36,300	13.8
c. Known municipal STP's -		
Nashville	3,930	1.5
Foreman	680	0.3
DeQueen	6,955	2.7
Dierks	995	0.4
Horatio	880	0.3
Lockesburg	705	0.3
Mineral Springs	635	0.2
Ashdown	2,810	1.1
d. Septic tanks - None		
e. Known industrial - See †, page 12.		
f. Direct precipitation* -	2,070	0.8
Totals	262,375	100.0
2. Output - A-1 Little River	279,845	
3. Net annual P export** -	17,470	

*Estimated (see NES Working Paper No. 175).
**Export probably due to unknown sources and/or sampling error.

C. Annual Total Nitrogen Loading - Average Year:

1. Inputs -

Source	kg N/yr	% of total
a. Tributaries (nonpoint load) -		
A-2 Little River	2,325,125	64.4
B-1 Flat Creek	61,405	1.7
J-1 Cossatot River	262,650	7.3
N-1 Saline River	177,705	4.9
Q-1 Blue Bayou	14,585	0.4
R-1 Dillard Creek	18,135	0.5
T-1 Coleman Creek	16,165	0.4
b. Minor tributaries and immediate drainage (nonpoint load) -	536,590	14.9
c. Known municipal STP's -		
Nashville	16,515	0.5
Foreman	1,045	<0.1
DeQueen	33,960	0.9
Dierks	1,815	0.1
Horatio	2,635	0.1
Lockesburg	2,110	0.1
Mineral Springs	1,905	0.1
Ashdown	8,435	0.2
d. Septic tanks - None		
e. Known industrial - See †, page 12.		
f. Direct precipitation* -	127,575	3.5
Totals	3,608,355	100.0
2. Output - A-1 Little River	2,406,545	
3. Net annual N accumulation -	1,201,810	

*Estimated (see NES Working Paper No. 175).

D. Mean Annual Nonpoint Nutrient Export by Subdrainage Area:

Tributary	kg P/km^2/yr	kg N/km^2/yr
Little River	23	336
Flat Creek	23	385
Cossatot River	16	233
Saline River	29	264
Blue Bayou	19	241
Dillard Creek	29	408
Coleman Creek	20	372

E. Mean Nutrient Concentrations in Ungaged Streams:

Tributary	Mean Total P (mg/l)	Mean Total N (mg/l)
C-1 Cypress Creek	0.027	0.550
D-1 Hurricane Creek	0.034	0.598
E-1 Caney Creek	0.056	0.462
G-1 Cool Creek	0.031	0.809
H-1 Bridge Creek	0.047	0.542
M-1 Sand Creek	0.055	0.559
P-1 Rock Creek	0.043	0.649
W-2 Mine Creek	0.144	1.215

The mean nutrient concentrations for the above ungaged streams (except Mine Creek) are generally in line with levels in the unimpacted gaged tributaries entering Millwood Reservoir. Mine Creek, tributary W-1, has substantially higher nutrient levels due to the impact of the Nashville municipal sewage treatment plant upstream.

F. Yearly Loadings:

In the following table, the existing phosphorus annual loading is compared to the relationship proposed by Vollenweider (1975). Essentially, his eutrophic loading is that at which the receiving waters would become eutrophic or remain eutrophic; his oligotrophic loading is that which would result in the receiving water remaining oligotrophic or becoming oligotrophic if morphometry permitted. A mesotrophic loading would be considered one between eutrophic and oligotrophic.

Note that Vollenweider's model may not apply to lakes with short hydraulic retention times or in which light penetration is severely restricted by high concentrations of suspended solids in the surface waters.

	Total Yearly Phosphorus Loading ($g/m^2/yr$)
Estimated loading for Millwood Reservoir	2.22
Vollenweider's eutrophic loading	1.27
Vollenweider's oligotrophic loading	0.64

V. LITERATURE REVIEWED

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VI. APPENDICES

APPENDIX A

CONVERSION FACTORS

CONVERSION FACTORS

Hectares x 2.471 = acres

Kilometers x 0.6214 = miles

Meters x 3.281 = feet

Cubic meters x 8.107×10^{-4} = acre/feet

Square kilometers x 0.3861 = square miles

Cubic meters/sec x 35.315 = cubic feet/sec

Centimeters x 0.3937 = inches

Kilograms x 2.205 = pounds

Kilograms/square kilometer x 5.711 = lbs/square mile

APPENDIX B

TRIBUTARY FLOW DATA

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/11/75

LAKE CODE 0511 MILLWOOD RESERVOIR

TOTAL DRAINAGE AREA OF LAKE(SQ KM) 10733.0

TRIBUTARY	SUB-DRAINAGE AREA(S. KM)	NORMALIZED FLOWS(CMS) JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	MEAN
051141	10733.0	154.31	254.03	297.1	241.26	365.68	144.08	33.13	24.15	32.71	27.10	131.05	203.31	162.98
051142	6925.7	155.03	174.71	178.91	201.84	213.99	76.20	30.41	22.06	29.05	31.60	70.40	108.60	107.86
051161	159.5	3.20	4.08	4.13	4.81	4.36	1.02	0.82	0.32	0.80	0.76	1.52	2.32	2.33
051101	1124.2	23.11	29.42	29.85	34.63	31.54	7.34	5.95	2.28	5.75	5.47	10.96	16.76	16.85
051181	873.4	12.01	12.86	19.41	22.34	21.63	6.20	1.53	1.16	1.53	1.09	7.02	11.50	9.88
051121	60.6	1.25	1.59	1.62	1.87	1.71	0.40	0.32	0.12	0.31	0.29	0.59	0.91	0.91
051171	43.5	0.96	1.22	1.24	1.44	1.31	0.31	0.25	0.10	0.24	0.23	0.44	0.67	0.67
051177	1696.4	32.56	46.13	44.78	54.24	49.44	11.55	9.32	3.57	9.00	8.55	17.19	26.28	26.09

SUMMARY

TOTAL DRAINAGE AREA OF LAKE = 10733.0
SUM OF SUB-DRAINAGE AREAS = 10732.9

TOTAL FLOW IN = 1991.16
TOTAL FLOW OUT = 1962.92

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
051141	6	74	475.44	22	343.60				
	7	74	43.89	21	92.03				
	8	74	43.83	18	96.56				
	9	74	436.65	22	509.70				
	10	74	226.03	19	116.10				
	11	74	683.29	24	676.77				
	12	74	508.57	22	252.02				
	1	75	128.14	18	127.43				
	2	75	487.62	13	1010.91				
	3	75	329.32	9	98.26	26	267.59		
	4	75	249.96	11	393.60	23	104.21		
	5	75	337.72	18	232.76				
051142	6	74	223.70	22	198.22				
	7	74	39.08	21	35.40				
	8	74	30.58	18	50.69				
	9	74	295.34	22	169.90				
	10	74	140.45						
	11	74	453.64	20	385.11				
	12	74	270.43	20	109.87				
	1	75	67.39	19	47.88				
	2	75	293.36	22	60.60				
	3	75	182.08	9	38.51	22	171.88		
	4	75	181.51	5	402.10	14	143.57		
	5	75	176.41	27	41.06				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/11/75

LAKE CODE 0511 MILLWOOD RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
051101	5	74	9.97	22	6.85				
	7	74	0.05	21	0.03				
	8	74	1.00	18	0.08				
	9	74	6.85	22	3.96				
	10	74	2.07						
	11	74	12.80	20	1.42				
	12	74	5.99	20	1.42				
	1	75	2.29	19	0.71				
	2	75	10.53	22	2.83				
	3	75	8.44	9	0.42	22	6.23		
	4	75	3.99	14	2.12	23	1.56	25	0.57
	5	75	6.71	27	0.96				
051101	6	74	70.51	22	8.50				
	7	74	4.62	21	1.43				
	8	74	7.08	18	1.43				
	9	74	48.45	22	14.16				
	10	74	14.61						
	11	74	90.59	20	11.61				
	12	74	49.53	20	8.50				
	1	75	16.23	19	8.50				
	2	75	74.47	22	16.99				
	3	75	59.61	9	7.79	22	21.52		
	4	75	28.32	25	8.21				
	5	75	47.57	27	6.94				
051101	6	74	58.90	22	7.42				
	7	74	0.61	21	0.40				
	8	74	0.55	18	0.28				
	9	74	20.56	22	3.96				
	10	74	4.25	19	1.25				
	11	74	49.55	24	143.00				
	12	74	28.85	22	5.38				
	1	75	9.15	18	5.58				
	2	75	40.78	23	44.17				
	3	75	12.74	9	11.33	26	9.20		
	4	75	12.74	14	9.97	23	6.51		
	5	75	26.62	18	14.58				
051101	6	74	3.79	22	0.82				
	7	74	0.25	21	0.03				
	8	74	0.38	18	0.05				
	9	74	2.60	22	1.47				
	10	74	0.78	19	0.28				
	11	74	4.87	24	14.72				
	12	74	2.66	22	0.85				
	1	75	0.87	18	0.68				
	2	75	3.99	23	4.81				
	3	75	3.20	9	0.51	26	2.83		
	4	75	1.53	14	2.27	23	0.59		
	5	75	2.55	15	1.67				

TRIBUTARY FLOW INFORMATION FOR ARKANSAS 02/11/75

LAKE CODE 0511 MILLWOOD RESERVOIR

MEAN MONTHLY FLOWS AND DAILY FLOWS(CMS)

TRIBUTARY	MONTH	YEAR	MEAN FLOW	DAY	FLOW	DAY	FLOW	DAY	FLOW
051141	6	74	2.75	22	6.57				
	7	74	0.18	21	0.03				
	8	74	0.08	18	0.03				
	9	74	1.91	22	1.13				
	10	74	0.58	19	0.23				
	11	74	3.57	24	9.91				
	12	74	1.45	22	0.57				
	1	75	0.64	18	0.57				
	2	75	2.94	23	6.55				
	3	75	6.35	9	0.34	24	2.12		
	4	75	1.10	14	1.70				
	5	75	1.87	15	1.27				
051171	6	74	2.72	22	6.57				
	7	74	0.18	21	0.03				
	8	74	0.27	18	0.03				
	9	74	1.87	22	1.13				
	10	74	0.56	19	0.23				
	11	74	3.48	24	9.91				
	12	74	1.91	22	0.51				
	1	75	0.63	18	0.42				
	2	75	6.86	23	2.12				
	3	75	2.29	9	0.31	26	1.98		
	4	75	1.10	14	1.42	23	0.42		
	5	75	1.84	18	0.93				
051177	6	74	105.90	22	42.45				
	7	74	6.94	21	2.83				
	8	74	10.65	18	2.83				
	9	74	72.80	22	39.64				
	10	74	21.47	19	3.11				
	11	74	136.09	20	89.48	24	198.22		
	12	74	74.39	20	17.56	22	0.0		
	1	75	24.35	18	14.41	19	16.41		
	2	75	111.85	13	22.65	22	99.11	23	111.29
	3	75	89.62	9	11.61	26	23.22	26	23.22
	4	75	42.48	14	27.61	23	19.82		
	4	75	42.48	23	7.93	25	15.01		
	5	75	71.36	15	4.34	18	36.81	27	7.08

23

APPENDIX C

PHYSICAL AND CHEMICAL DATA

STORET RETRIEVAL DATE 74/12/13
NATL EUTROPHICATION SURVEY
ERA-LAS VEGAS

051101
33 41 48.0 093 57 44.0
MILLWOOD LAKE
05 ARKANSAS

11FEALES
3

211292
0034 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/25	10 00 0000		11.0		24	35	6.90	10K	0.050	0.400	0.090	0.017
	10 00 0005		11.1	9.8		35	6.90	10K	0.040	0.300	0.100	0.026
	10 00 0015		11.1	9.8		34	6.90	14	0.040	0.300	0.100	0.027
	10 00 0030		10.7	10.4		33	6.90	17	0.040	0.300	0.100	0.025
74/06/03	11 10 0000		26.6		60	67	8.00	20	0.030	0.600	0.020	0.003
	11 10 0005		25.4	7.6		67	7.40	22	0.020	0.600	0.020	0.002
	11 10 0015		25.4	6.8		66	7.30	21	0.030	0.500	0.040	0.002
	11 10 0030		24.4	5.4		67	7.00	19	0.060	0.500	0.060	0.004
74/10/17	12 30 0000		19.4	8.0	36	31	6.37	13	0.070	0.600	0.030	0.009
	12 30 0005		19.0	7.8		31	6.29	14	0.060	0.400	0.030	0.006
	12 30 0020		18.9	7.6		31	6.29	13	0.040	0.400	0.030	0.005
	12 30 0030		18.2	7.6		31	6.23	14	0.040	0.400	0.040	0.006

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT PENNING PERCENT
74/03/25	10 00 0000		0.036	3.8	
	10 00 0005		0.034		
	10 00 0015		0.035		
	10 00 0030		0.037		
74/06/03	11 10 0000		0.038	29.6	
	11 10 0001				50.0
	11 10 0005		0.042		
	11 10 0004				1.0
	11 10 0015		0.047		
	11 10 0030		0.063		
74/10/17	12 30 0000		0.038	7.9	
	12 30 0004				1.0
	12 30 0005		0.032		
	12 30 0020		0.035		
	12 30 0030		0.033		

25

...T METEOROL... FOR WY ...
...L OUTDOOR LOCATION SURVEY ...
...A-LAS VEGAS

051102
33 43 28.0 094 01 05.0
MILLWOOD LAKE
05 ARKANSAS

11EMILES
3

2111206
0033 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CNDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/25	11 30	0000	11.7		20	35	6.80	21	0.040	0.300	0.040	0.026
	11 30	0005	11.7	8.4		35	6.80	22	0.040	0.300	0.100	0.025
	11 30	0015	11.7	8.4		35	6.85	22	0.030	0.300	0.090	0.016
	11 30	0025	11.7	8.6		35	6.85	20	0.040	0.300	0.090	0.024
74/06/03	11 45	0000	26.4		30	77	7.00	20	0.050	0.600	0.140	0.004
	11 45	0005	25.1	8.0		77	6.70	20	0.060	0.500	0.160	0.004
	11 45	0015	25.8	8.2		76	6.70	20	0.090	0.600	0.170	0.010
	11 45	0030	25.8	8.4		75	6.80	21	0.090	0.500	0.180	0.006
74/10/17	13 00	0000	19.0	7.8	25	45	6.11	20	0.070	0.500	0.090	0.008
	13 00	0005	18.4	7.4		45	6.11	19	0.060	0.400	0.090	0.008
	13 00	0015	18.8	7.2		45	6.11	19	0.060	0.400	0.090	0.007
	13 00	0023	18.8	7.4		42	6.09	21	0.060	0.400	0.090	0.007

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00631 INCDT LT REMNING PERCENT
74/03/25	11 30	0000	0.033	3.0	
	11 30	0005	0.036		
	11 30	0015	0.034		
	11 30	0025	0.037		
74/06/03	11 45	0000	0.051	9.8	
	11 45	0005	0.050		
	11 45	0015	0.046		
	11 45	0030	0.059		
74/10/17	13 00	0000	0.043	6.1	
	13 00	0004			1.0
	13 00	0005	0.043		
	13 00	0015	0.040		
	13 00	0023	0.043		

STONEY REMOVAL DATA [illegible]
NATL REPORTING [illegible]
EPA-LAS VEGAS

051193
33 46 18.0 093 57 15.0
MILLWOOD LAKE
05 ARKANSAS

1 FEMALES
3

PILLBOX
0015 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00010 WATER TEMP CENT	00300 DO MG/L	00077 TRANSP SECCHI INCHES	00094 CONDUCTVY FIELD MICROMHO	00400 PH SU	00410 T ALK CACO3 MG/L	00610 NH3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00630 NO2&NO3 N-TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P
74/03/25	11 55	0000	11.2		36	106	7.80	52	0.030	0.400	0.050	0.018
	11 55	0005	11.2	9.4		106	7.75	52	0.030	0.400	0.040	0.017
	11 55	0010	11.1	9.4		107	7.70	49	0.030	0.400	0.040	0.017
74/06/03	13 25	0000	26.3		36	158	8.00	63	0.030	1.000	0.050	0.008
	13 25	0005	26.2	8.6		158	8.75	67	0.020	0.400	0.030	0.005
	13 25	0010	25.8	6.2		161	8.20	66	0.030	0.700	0.030	0.007
74/10/17	13 20	0000	18.7	8.6	26	145		74	0.030	0.700	0.020K	0.008
	13 20	0005	18.7	7.4		147		74	0.030	0.500	0.020K	0.008
	13 20	0009	18.7	7.4		153		74	0.030	0.400	0.020K	0.008

DATE FROM TO	TIME OF DAY	DEPTH FEET	00665 PHOS-TOT MG/L P	32217 CHLRPHYL A UG/L	00031 INCDT LT REMNING PERCENT
74/03/25	11 55	0000	0.035	6.2	
	11 55	0005	0.036		
	11 55	0010	0.038		
74/06/03	13 25	0000	0.065	50.6	
	13 25	0001			50.0
	13 25	0005	0.061		1.0
	13 25	0010	0.071		
74/10/17	13 20	0000	0.051	17.7	
	13 20	0004			1.0
	13 20	0005	0.064		
	13 20	0009	0.090		

— K VALUE KNOWN TO BE LESS THAN INDICATED —

APPENDIX D

TRIBUTARY AND WASTEWATER TREATMENT PLANT DATA

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051141
33 41 35.0 093 57 35.0
LITTLE RIVER
05 LITTLE RIVER CO
MILLWOOD RESERVOIR
2NDRY RD BRDG AT MILLWOOD DAM
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 30		0.052	0.300	0.055	0.010	0.040
74/07/21	15 30		0.008	0.500	0.025	0.015	0.075
74/08/18	14 00		0.008	0.400	0.010	0.020	0.035
74/10/19	10 30		0.016	0.400	0.045	0.030	0.040
74/11/24	15 00		0.072	0.300	0.032	0.010	0.040
74/12/22	15 30		0.104	0.300	0.030	0.010	0.030
75/01/18	12 30		0.072	0.275	0.008K	0.007	0.065
75/02/13	10 00		0.088	0.325	0.042	0.008	0.030
75/03/09	14 00		0.042	0.300	0.035	0.010	0.050
75/03/26	12 30		0.110	0.450	0.060	0.016	0.060
75/04/11	13 00		0.035	0.650	0.030	0.020	0.100
75/04/23	13 30		0.030	0.450	0.010	0.015	0.060
75/05/18	10 30		0.180	0.600	0.025	0.021	0.080

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051142
33 35 15.0 094 23 10.0
LITTLE RIVER
05 LT RIVER COUNTY
T/MILLWOOD RESERVOIR
AR HWY 41 BRDG 2 MI NW PILLINGSLY CORNER
11ECALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 15		0.056	0.200	0.037	0.005K	0.037
74/07/21	10 45		0.028	0.200	0.015	0.010	0.030
74/08/18	11 45		0.148	0.400	0.025	0.020	0.035
74/12/20	10 45		0.048	0.300	0.008	0.010	0.030
75/01/19	10 45		0.108	0.400	0.105	0.015	0.060
75/02/22	10 45		0.104	1.300	0.056	0.016	0.040
75/03/19	10 45		0.098	0.300	0.027	0.012	0.070
75/03/22	10 45		0.098	0.200	0.014	0.009	0.050
75/04/05	11 00		0.090	1.150	0.260	0.025	0.100
75/04/14	10 45		0.080	1.150	0.035	0.005	0.030
75/04/25	10 45		0.080	0.400	0.040	0.008	0.030
75/05/27	10 45		0.250	0.850	0.040	0.015	0.080

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/20
WATL FUTROPHICATION SURVEY
EPA- LAS VEGAS

351131
33 +7 10.0 094 19 35.0
FLAT CREEK
05 LITTLE RIVER CO
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 2.7 MI SE AR HWY 234 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	09 40		0.032	0.800	0.035	0.025	0.070
74/12/20	09 40		0.016	0.400	0.040	0.035	0.060
75/01/19	09 10		0.012	0.400	0.075	0.025	0.040
75/02/22	09 46		0.016	1.600	0.056	0.040	0.040
75/03/09	09 40		0.008	0.300	0.028	0.024	0.060
75/03/22	09 40		0.009	0.300	0.015	0.018	0.040
75/04/14	09 40		0.010	1.080	0.036	0.015	0.075
75/04/23	14 30		0.040	0.400	0.015	0.010	0.040
75/04/25	09 40		0.025	1.200	0.042	0.027	0.080
75/05/27	09 40		0.070	1.450	0.100	0.030	0.110

16

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051102
33 49 35.0 094 20 35.0
CYPRESS CREEK
05 LITTLE RIVER CO
T/MILLWOOD RESERVOIR
AR HWY BRDG 234 0.7 MI SE WINTHROP CITY
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	09	55	0.028	0.400	0.035	0.010	0.040
74/12/20	09	55	0.048	0.600	0.030	0.010	0.020
75/01/19	09	55	0.024	0.100	0.064	0.005	0.010
75/02/22	09	55	0.040	1.300	0.104	0.010	0.020
75/03/09	09	55	0.016	0.300	0.024	0.008K	0.030
75/03/22	09	55	0.015	0.200	0.009	0.005K	0.010
75/04/14	09	55	0.015	0.800	0.035	0.005	0.030
75/04/25	09	55	0.010	0.650	0.085	0.010	0.050
75/05/27	09	55	0.005	0.400	0.020	0.010	0.030

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051101
33 50 05.0 094 20 15.0
HURRICANE CREEK
05 LITTLE RIVER CC
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 1 MI E OF WINTHROP CITY
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10	10	0.120	0.700	0.120	0.040	0.100
74/12/20	10	10	0.032	0.400	0.035	0.010	0.020
75/01/19	10	10	0.032	0.200	0.056	0.005	0.010
75/02/22	10	10	0.024	0.800	0.040	0.008K	0.010
75/03/09	10	10	0.016	0.200	0.016	0.008K	0.050
75/03/22	10	10	0.018	0.250	0.009	0.005K	0.010
75/04/14	10	10	0.015	1.050	0.075	0.005	0.030
75/04/25	10	10	0.015	1.200	0.075	0.005	0.040
75/05/27	10	10	0.010	0.300	0.020	0.005	0.040

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051131
33 52 25.0 094 25 20.0
JANEY CREEK
05 LT RIVER COUNTY
J/MILLWOOD RESERVOIR
AR HWY 41 BRDG 2.5 MI SSW PILLINGSLY CRN
ALLEPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH FEET	00630 N&NO3-N TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 30		0.060	0.600	0.050	0.025	0.075
74/12/20	10 30		0.008	0.300	0.020	0.010	0.040
75/01/19	10 30		0.008	0.100K	0.056	0.005	0.020
75/02/22	10 30		0.008	0.200	0.032	0.008	0.020
75/03/09	10 30		0.016	0.300	0.032	0.012	0.090
75/03/22	10 30		0.015	0.250	0.005	0.009	0.060
75/04/14	10 30		0.005	0.550	0.030	0.010	0.040
75/04/25	10 30		0.005	0.650	0.055	0.016	0.050
75/05/27	10 30		0.050	0.675	0.087	0.042	0.105

— K VALUE KNOWN TO BE LESS THAN INDICATED —

34

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051101
33 54 12.0 094 18 15.0
COOL CREEK
05 SEVIER COUNTY
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 2 MI S OF WILLIAMSON
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	10	0.288	0.300	0.020	0.010	0.030
74/07/21	11	10	0.100	0.900	0.040	0.010	0.040
74/12/20	11	10	0.296	0.200	0.015	0.010	0.020
75/01/19	11	10	0.336	1.500	0.064	0.010	0.019
75/02/22	11	10	0.320	0.300	0.024	0.008K	0.010K
75/03/09	11	10	0.316	0.300	0.024	0.012	0.060
75/03/22	11	10	0.313	0.200	0.018	0.005	0.020
75/04/14	11	10	0.270	0.400	0.025	0.005	0.010
75/04/25	11	10	0.270	0.500	0.025	0.005	0.030
75/05/27	11	10	0.280	0.700	0.060	0.010	0.050

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051141
33 55 30.0 094 14 44.0
BRIDGE CREEK
05 7.5 LOCKESBURG
T/MILL+ODD RESERVOIR
2NDRY RD BRDG 0.8 MI S OF STRINGTOWN
ARKANSAS 2111204
0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH DAY	FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	55		0.120	0.200	0.025	0.005	0.020
74/12/20	11	55		0.016	0.400	0.035	0.020	0.040
75/01/19	11	35		0.016	0.100K	0.048	0.015	0.025
75/02/22	11	55		0.008	0.300	0.064	0.040	0.040
75/03/09	11	55		0.016	0.900	0.024	0.028	0.080
75/03/22	11	55		0.015	0.500	0.018	0.022	0.060
75/04/14	11	55		0.045	0.500	0.020	0.005	0.020
75/04/25	11	55		0.050	0.300	0.025	0.005	0.030
75/05/27	11	55		0.060	0.900	0.070	0.025	0.110

7

36

STORET RETRIEVAL DATE 75/11/20
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0511J1
33 53 15.0 094 12 03.0
COOSAWATTEE RIVER
05 7.5 LOCKESBURG
T/MILLWOOD RESERVOIR
BRDG UNIMPROVED RD 0.6 M W 2NDRY RD JCT
LITTLE RED 2111204
4 3700 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N02&N03 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	30	0.124	0.300	0.055	0.005	0.045
74/07/21	11	30	0.016	0.700	0.020	0.012	0.030
74/08/18	11	30	0.032	0.200	0.010	0.025	0.025
74/12/20	11	30	0.192	0.600	0.020	0.010	0.030
75/01/19	11	30	0.036	0.300	0.056	0.015	0.030
75/02/22	11	30	0.008	0.500	0.032	0.016	0.030
75/03/09	11	30	0.040	0.175	0.018	0.013	0.030
75/03/22	11	30	0.040	0.050	0.010	0.005K	0.020
75/04/14	11	30	0.045	0.600	0.045	0.005	0.030
75/04/25	11	30	0.045	0.350	0.035		0.035
75/05/27	11	30	0.170	0.800	0.055	0.020	0.090

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051141
33 52 53.0 094 04 50.0
SAND CREEK
05 7.5 SILVER RIDGE
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 3.4 MI NE AR HWY 27 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	13	30		0.048	0.300	0.025	0.010	0.045
74/10/19	08	00		0.056	0.100K	0.085	0.020	0.020
74/11/24	13	30		0.120	0.600	0.104	0.035	0.090
74/12/22	17	30		0.200	0.200	0.020	0.010	0.020
75/01/16	15	30		0.248	0.100	0.008	0.015	0.030
75/02/23	15	30		0.184	0.400	0.024	0.008K	0.010
75/03/09	17	15		0.200	0.200	0.016	0.024	0.060
75/03/26	16	30		0.316	0.350	0.020	0.016	0.050
75/04/11	15	35		0.035	0.650	0.035		0.120
75/04/23	17	00		0.030	0.575	0.010	0.015	0.095
75/05/18	13	05		0.185	0.650	0.025	0.019	0.070

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

05114N1
33 57 44.0 094 03 43.0
SALINE RIVER
05 4.5 SILVER RIDGE
T/MILLWOOD RESERVOIR
AR HWY 24 BRDG 0.9 MI N AR HWY 26 JCT
11EPALRS 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	12	25	0.208	0.500	0.090	0.012	0.061
74/07/21	17	30	0.028	0.400	0.015	0.015	0.045
74/08/18	15	45		0.500	0.010	0.016	0.016
74/10/19	08	15	0.032	0.200	0.025	0.010	0.030
74/11/24	17	15	0.096	0.800	0.088	0.035	0.180
74/12/22	17	15	0.176	0.200	0.015	0.010	0.030
75/01/18	15	00	0.160	0.100	0.016	0.021	0.021
75/02/23	15	00	0.184	0.300	0.032	0.016	0.020
75/03/09	17	00	0.120	0.600	0.028	0.016	0.120
75/03/26	15	00	0.112	0.500	0.040	0.012	0.060
75/04/11	15	30	0.030	0.700	0.020		0.160
75/04/23	16	00	0.030	0.400	0.005	0.010	0.050
75/05/18	12	25	0.185	0.500	0.025	0.020	0.080

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0511P1
33 36 25.0 094 01 50.0
ROCK CREEK
00 7.5 SILVER RIDGE
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 2 MI SW JT HWY 24 JCT
11EPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	12	30	0.450	0.100K	0.015	0.005	0.020
74/10/19	08	30	0.080	0.100	0.025	0.005	0.010
74/11/24	17	30	0.216	0.500	0.064	0.025	
74/12/22	17	30	0.240	0.300	0.025	0.005	0.020
75/01/18	14	30	0.240	0.100K	0.024	0.012	0.020
75/02/23	14	30	0.640	0.500	0.024	0.024	0.024
75/03/26	18	30	0.655	0.300	0.012	0.016	0.080
75/03/26	15	20	0.112	0.500	0.032	0.016	0.060
75/04/11	16	30	0.030	0.500	0.030	0.025	0.080
75/04/23	15	00	0.030	0.450	0.005	0.015	0.050
75/05/18	12	20	0.185	0.500	0.025	0.025	0.070

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051101
33 53 10.0 093 58 52.0
BLUE BAYOU
35 7.5 MIN SPRGS N
T/MILLWOOD RESERVOIR
GRAVEL RD BRDG 4 MI NW MINERAL SPRINGS
LITTLE RED 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	12 30		0.184	0.100K	0.020	0.005K	0.020
74/07/21	17 00		0.036	0.200	0.030	0.010	0.050
74/08/18	15 15		0.076	0.600	0.045	0.035	0.080
74/10/19	08 45		0.064	0.100K	0.025	0.005	0.015
74/11/24	16 30		0.216	0.500	0.024	0.025	
74/12/22	16 45		0.240	0.200	0.020	0.010	0.020
75/01/18	14 00		0.248	0.100K	0.016	0.009	0.020
75/02/23	14 20		0.184	0.200	0.015	0.005	0.010K
75/03/09	16 30		0.232	0.200	0.016	0.016	0.050
75/03/26	16 00		0.112	0.550	0.032	0.014	0.060
75/04/11	15 45		0.045	0.450	0.030	0.030	0.090
75/04/23	16 30		0.035	0.450	0.010	0.015	0.050
75/05/15	12 00		0.185	0.900	0.025	0.015	0.090

— K VALUE KNOWN TO BE LESS THAN INDICATED —

14

STORET RETRIEVAL DATE 75/11/23
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

051181
33 53 22.0 093 54 20.3
DILLARD CREEK
05 7.5 MINPL SPRINGS
T/MILLWOOD RESERVOIR
AR HWY 27 BRDG 1.1 MI NNE AR HWY 355 JCT
11EPALTS 2111204
4 0700 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO3&NO2 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10 45		0.290	0.300	0.030	0.005	0.035
74/07/21	16 30		0.140	2.450	0.760	0.030	0.133
74/08/18	14 45		0.080	1.200	0.570	0.045	0.105
74/10/19	09 30		0.080	0.100	0.070	0.005K	0.020
74/11/24	15 45		0.152	0.600	0.080	0.065	0.170
74/12/22	16 15		0.256	0.500	0.025	0.010	0.020
75/01/18	13 15		0.256	0.100	0.016	0.008	0.015
75/02/23	13 40		0.224	0.300	0.024	0.008K	0.020
75/03/09	15 36		0.228	0.400	0.028	0.016	0.060
75/03/26	14 15		0.316	0.550	0.016	0.016	0.050
75/04/11	15 00		0.040	0.500	0.020	0.030	0.100
75/05/15	10 52		0.185	0.650	0.020	0.015	0.090

— K VALUE KNOWN TO BE LESS THAN INDICATED —

42

STORET RETRIEVAL DATE 75/11/24
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0511T1
33 33 03.0 093 51 15.0
COLEMAN CREEK
05 7.5 NASHVILLE
T/MILLWOOD RESERVOIR
AR HWY 27 BRDG 4.5 MI NE MINERAL SPRNGS
11LPALES 2111204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO3&NO2 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11	00	0.350	0.300	0.010	0.005K	0.020
74/07/21	16	15	0.264	1.000	0.050	0.010	0.020
74/08/18	14	45	0.252	0.600	0.065	0.015	0.025
74/10/19	09	15	0.200	0.100	0.090	0.010	0.010
74/11/24	16	00	0.448	0.600	0.080	0.065	0.130
74/12/22	16	20	0.336	0.200	0.025	0.005	0.010
75/01/18	13	30	0.256	0.200	0.008	0.015	0.020
75/02/23	14	00	0.304	0.200	0.024	0.008K	0.010K
75/03/09	16	00	0.655	0.400	0.032	0.016	0.070
75/03/26	14	00	0.112	0.500	0.040	0.012	0.060
75/04/11	14	30	0.045	0.650	0.025	0.015	0.090
75/04/23	15	00	0.030	0.450	0.005	0.015	0.050
75/05/18	11	00	0.190	0.500	0.030	0.020	0.080

— K VALUE KNOWN TO BE LESS THAN INDICATED —

43

STORET RETRIEVAL DATE 75/11/25
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0511W1
33 55 02.0 093 51 55.0
MINE CREEK
05 7.5 NASHVILLE
T/MILLWOOD RESERVOIR
2NDRY RD BRDG 0.7 MI S AR HWY 27 JCT
11EPALES 2111204
0100 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	10	10	0.490	0.300	0.025	0.005	0.040
74/07/21	16	20	0.132	1.200	0.050	0.020	0.050
74/10/19	09	30	0.296	0.200	0.050	0.010	0.030
74/11/24	16	35	0.216	0.750	0.040	0.030	0.190
74/12/22	16	30	0.240	0.500	0.035	0.010	0.040
75/01/18	13	45	0.576	0.300	0.024	0.012	0.025
75/02/23	14	30	0.400	0.200	0.024	0.008K	0.020
75/03/09	14	30	0.276	0.700	0.224	0.032	0.100
75/03/26	13	45	0.316	0.300	0.024	0.008	0.050
75/04/11	13	30	0.040	0.550	0.015	0.010	0.160
75/04/23	14	30	0.030	0.450	0.010	0.015	0.060
75/05/18	11	45	0.180	0.400	0.045	0.025	0.080

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

351142
33 31 45.0 093 54 35.0
MINE CREEK
35 7.5 MI. SPRINGS S
T/HILL=000 RESERVOIR
HWY 355 PROG 1 MI SE OF MINERAL SPRINGS
11EPALES 2111204
0 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P
74/06/22	11 30		0.504	0.500	0.060	0.085	0.160
74/07/21	15 45		0.720	1.800	0.220	0.080	0.260
74/08/18	14 30		1.900	2.600	1.200	0.240	0.440
74/10/19	09 45		0.720	0.400	0.075	0.090	0.170
74/11/24	16 30		0.216	0.700	0.040	0.055	0.160
74/12/22	16 00		0.336	0.600	0.165	0.020	0.100
75/01/18	13 00		0.464	0.550	0.304	0.025	0.065
75/02/23	13 30		0.448	0.750	0.384	0.040	0.090
75/03/09	15 00		0.272	0.550	0.212	0.031	0.090
75/03/26	13 00		0.316	0.250	0.024	0.008	0.050
75/04/11			0.040	0.700	0.010	0.015	0.150
75/04/23	13 30		0.030	0.400	0.010	0.015	0.050
75/05/18	11 30		0.180	0.550	0.020	0.020	0.090

STORET RETRIEVAL DATE 75/11/24
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

3511TA P0511TA P001150
33 +3 30.0 093 24 45.0
FOREMAN
05 7.5 FOREMAN
T/MILLWOOD RESERVOIR
EAST FLAT CREEK
11EPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH DAY	FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/07	09	00		0.320	1.000K	0.140	3.600	3.700	0.180	0.180
75/03/10	09	00		0.004		0.210	4.400		0.232	0.117
75/04/14	08	30		0.400	5.550	0.150	0.280	4.600	0.280	0.145
75/05/06	15	30		0.050	2.600	0.050	0.890	1.100	0.090	0.190
75/05/21	08	30		0.050	4.975	0.050K	2.800	3.100	0.280	0.180
75/06/25	08	30		0.050	5.500	0.100	1.850	2.500	0.140	0.160
75/07/08	08	30		0.100	10.000	0.390	3.400	4.300	0.141	0.061
75/07/31	08	30		0.125	8.200	0.360	3.150	3.600	0.041	0.067

— K VALUE KNOWN TO BE LESS THAN INDICATED —

STORET RETRIEVAL DATE 75/11/28
NATL EUTROPHICATION SURVEY
EPA- LAS VEGAS

0511WA PD0511WA P004400*
36 00.0 093 50 30.0
NASHVILLE
05 7.E NASHVILLE
T/MILLWOOD RESERVOIR
MINE CREEK
11cPALES 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 NO3&NO2 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/01/27	10 30		0.325	20.000	9.450	1.000	1.950	0.500	0.500
75/02/26	08 30		0.320	6.500	0.280	0.990	1.700	1.500	1.000
75/03/24	15 00		0.320	20.000	10.400	2.100	2.900	1.200	1.100
75/04/28	12 30		0.100	24.000	15.000	2.800	3.700	1.000	0.800
75/05/08	16 00		0.200	21.000	10.500	3.600	4.000	0.800	0.600
75/07/16			0.575	7.800	2.400	3.900	4.200	0.700	0.500
75/07/28	10 00		0.425	9.100	2.800	4.400	5.100	0.900	0.950
75/08/05	08 30		0.725	13.500	2.200	4.700	5.600	1.100	0.900

47

START RETRIEVAL DATE 75/11/20
WATER AUTHORIZATION SURVEY
RUN= LAS VEGAS

351144 PD3511X8 P3041300
34 31 00.0 394 20 00.0
DEQUEEN
29 .5 DEQUEEN
T/MILL+COD RESERVOIR
BEAR CREEK TO LITTLE RIVER
LITTLES 2141204
0000 FEET DEPTH

DATE FROM TO	TIME OF DAY	DEPTH FEET	00630 N+NO2+NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/01/14	14 30		0.024	17.000	0.053	2.500	3.830	1.160	1.000
75/02/12	10 00		0.080	5.700	3.600	2.300	2.000	1.000	1.000
75/03/12	15 30		0.030	25.000	4.640	2.700	4.730	1.000	1.000
75/04/11	15 00		0.050	19.000	2.400	2.200	3.730	1.100	1.100
75/05/29	13 33		0.050	28.000	3.300	2.200	5.300	1.200	1.200
75/05/14	15 33		0.250	24.000	3.400	1.650	4.300	1.200	1.200
75/06/32	11 33		0.100	28.000	4.700	2.700	4.200	1.200	1.200
75/06/30	15 30		0.277	17.000	2.840	3.150	4.300	1.200	1.200
75/07/18	11 30		0.025	22.000	2.880	3.700	5.200	1.200	1.200
75/08/04	14 00		0.350	23.000	2.900	4.000	5.700	1.200	1.200

84

START PERIOD OF RECORD 75/11/20
WATER QUALITY RECONNAISSANCE SURVEY
AREA LAS VEGAS

[illegible] P00511VA P00500
34 06 45.0 094 09 40.3
CLERKS
39 7.5 DISKS
I/MILLWOOD RESERVOIR
MOLLY CREEK
ALBANIS 2141204
0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH DAY	FEET	00630 NO2&NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-DIS ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/02/12	10	00		0.240	4.800	3.400	3.400	4.100	0.160	
75/03/24	13	30		0.240	12.000	2.720	5.100	6.700	0.106	
75/04/15	14	30		0.050	12.000	4.800	6.300	8.300	0.112	0.100
75/04/18	10	00		0.050	13.500	4.800	6.000	7.100	0.092	0.112
75/05/07	09	00		0.150	8.500	1.950	5.400	6.400	0.188	0.120
75/05/12	14	30		0.050	30.000	1.600	5.330	6.400	0.112	0.171
75/06/06	14	30		0.050	10.500	2.200	7.400	9.300	0.074	0.125
75/07/07	14	00		0.050	16.000	3.400	6.500	8.000	0.123	0.088
75/07/09	16	00		0.025	9.500	4.400	7.300	8.500	0.056	0.080
75/07/14	10	00		0.075	21.000	2.200	7.400	8.900	0.074	0.079
75/08/06	10	30		0.150	11.000	1.400	7.700	9.400	0.051	0.059
75/08/13	10	00		0.025	16.000	1.150	8.100	9.900	0.036	0.048
75/08/21	10	30		0.075	10.000	0.950	8.000	9.400	0.066	0.058

...DET RETRIEVAL DATE 75/11/28
...ATL EUTROPHICATION SURVEY
...RA= LAS VEGAS

051127A PD051127A P000775
33 33 45.0 094 21 03.0
MORATI
...S 7.5 MORATIC
T/MILLWOOD RESERVOIR
INT. STREAM TO LITTLE RIVER
LLERPALTS 2141204
4 0000 FEET DEPTH

DATE FROM TO	TIME	DEPTH	00630 N+NO3 N-TOTAL MG/L	00625 TOT KJEL N MG/L	00610 NH3-N TOTAL MG/L	00671 PHOS-ORTHO MG/L P	00665 PHOS-TOT MG/L P	50051 FLOW RATE INST MGD	50053 CONDUIT FLOW-MGD MONTHLY
75/01/29	09	30	3.150	10.500	4.750	2.450	3.900		
75/02/27	09	30	3.480	7.200	3.000	1.840	2.500		
75/04/18	09	30	3.050	7.800	2.100	2.000	2.600		
75/04/30	10	30	0.050	5.300	1.600	2.400	2.800		
75/05/23	11	30	3.050	5.500	1.580	2.200	2.400		
75/07/01	10	30	0.075	4.700	0.340	2.300	2.500	0.020	0.025
75/07/18	15	15	0.025	9.400	0.050	5.000	5.000	0.002	0.009
75/08/03	15	30	0.025	8.700	0.575	4.000	4.900	0.063	0.090

APPENDIX E

PARAMETRIC RANKINGS OF LAKES SAMPLED BY NES IN 1974

STATE OF ARKANSAS

LAKE DATA TO BE USED IN REGRESSION

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500- MEAN SEC	MEAN CHLORA	15- MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	0.022	0.330	415.667	3.421	14.400	0.006
0502	BLACKFISH LAKE	0.420	1.470	440.125	19.775	12.000	0.040
0503	BLUE MOUNTAIN LAKE	0.038	0.160	484.000	8.483	14.600	0.010
0504	BULL SHOALS LAKE	0.013	0.340	343.964	3.495	15.000	0.004
0505	LAKE CATHERINE	0.024	0.180	451.667	14.042	11.800	0.008
0506	LAKE CHICOT	0.162	0.450	488.000	13.722	14.600	0.089
0507	DEGRAY RESERVOIR	0.014	0.130	419.050	12.300	15.000	0.004
0508	LAKE ERLING	0.054	0.120	454.667	13.389	14.600	0.020
0509	GRAND LAKE	0.101	0.040	479.667	62.867	8.400	0.021
0510	LAKE HAMILTON	0.024	0.130	428.111	10.489	14.400	0.006
0511	MILLWOOD LAKE	0.040	0.120	466.778	14.967	9.800	0.008
0512	NIMROD LAKE	0.039	0.160	469.000	15.833	8.800	0.006
0513	NORFOLK LAKE	0.015	0.320	356.321	3.441	15.000	0.005
0514	LAKE OUACHITA	0.015	0.155	389.144	4.344	15.000	0.006
0515	TABLE ROCK LAKE	0.022	0.350	410.778	9.103	15.000	0.007
0516	GREER'S LAKE	0.012	0.140	370.875	3.762	15.000	0.004

PERCENT OF LAKES WITH HIGHER VALUES (NUMBER OF LAKES WITH HIGHER VALUES)

LAKE CODE	LAKE NAME	MEDIAN TOTAL P	MEDIAN INORG N	500-MEAN SEC	MEAN CHLORA	15-MIN DO	MEDIAN DISS ORTHO P
0501	BEAVER LAKE	53 (8)	27 (4)	67 (10)	87 (13)	40 (6)	63 (9)
0502	BLACKFISH LAKE	0 (0)	0 (0)	0 (0)	7 (1)	73 (11)	0 (0)
0503	BLUE MOUNTAIN LAKE	20 (3)	47 (7)	13 (2)	67 (10)	57 (8)	27 (4)
0504	BULL SHOALS LAKE	90 (13)	13 (2)	100 (15)	80 (12)	17 (0)	93 (13)
0505	LAKE CATHERINE	47 (7)	40 (6)	47 (7)	27 (4)	80 (12)	63 (8)
0506	LAKE CHICOT	7 (1)	7 (1)	7 (1)	33 (5)	47 (7)	7 (1)
0507	DEGRAY RESERVOIR	73 (11)	77 (11)	60 (9)	47 (7)	17 (0)	93 (13)
0508	LAKE ERLING	27 (4)	90 (13)	40 (6)	40 (6)	57 (8)	20 (3)
0509	GRAND LAKE	13 (2)	100 (15)	20 (3)	0 (0)	100 (15)	13 (2)
0510	LAKE HAMILTON	53 (8)	77 (11)	53 (8)	53 (8)	67 (10)	63 (8)
0511	MILLWOOD LAKE	33 (5)	90 (13)	33 (5)	20 (3)	87 (13)	33 (5)
0512	NIMROD LAKE	40 (6)	53 (8)	27 (4)	13 (2)	93 (14)	47 (7)
0513	NORFOLK LAKE	80 (12)	33 (5)	93 (14)	100 (15)	17 (0)	80 (12)
0514	LAKE OUACHITA	90 (13)	60 (9)	80 (12)	73 (11)	17 (0)	63 (8)
0515	TABLE ROCK LAKE	63 (9)	20 (3)	73 (11)	60 (9)	17 (0)	40 (6)
0516	GREERS LAKE	100 (15)	67 (10)	87 (13)	93 (14)	17 (0)	93 (13)

TECHNICAL REPORT DATA
(Please read Instructions on the reverse before completing)

1. REPORT NO.	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Report on Millwood Reservoir, Hempstead, Howard, Little River, and Sevier Counties, Arkansas		5. REPORT DATE Prepared January 1977 6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Anonymous (National Eutrophication Survey Staff)		8. PERFORMING ORGANIZATION REPORT NO. Working Paper No. 489
9. PERFORMING ORGANIZATION NAME AND ADDRESS National Eutrophication Survey U.S. Environmental Protection Agency P.O. Box 15027 Las Vegas, NV 89114		10. PROGRAM ELEMENT NO. 11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS Office of Research and Development U.S. Environmental Protection Agency 401 M Street, S. W. Washington, DC 20460		13. TYPE OF REPORT AND PERIOD COVERED Final - 1974 14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
Prepared in cooperation with the U.S. Environmental Protection Agency, Corvallis Environmental Research Laboratory, Eutrophication Survey Branch, Corvallis, OR 97330

16. ABSTRACT
Annual total phosphorus and total nitrogen loadings to the lake were estimated and subdivided according to either point or non-point source origin. An assessment of the lake's trophic condition and limiting nutrient is also provided. All data collected by the U.S.E.P.A. National Eutrophication Survey during the one year study of the lake and its tributaries are included in the report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
eutrophication lakes nutrients phosphorus nitrogen loading		05B 05C

18. DISTRIBUTION STATEMENT	19. SECURITY CLASS *(This Report)*	21. NO. OF PAGES
Release unlimited		60
	20. SECURITY CLASS *(This page)*	22. PRICE
		A04 - A01

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